Extraterrestrial
Institute

Extraterrestrial Activity

Teaser

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From year to year, interest in extraterrestrial activity is growing and gaining more weight. **Extraterrestrial Institute** analysed the extraterrestrial activity's scientific and fictional bases in order to define the future of research and development on this topic.

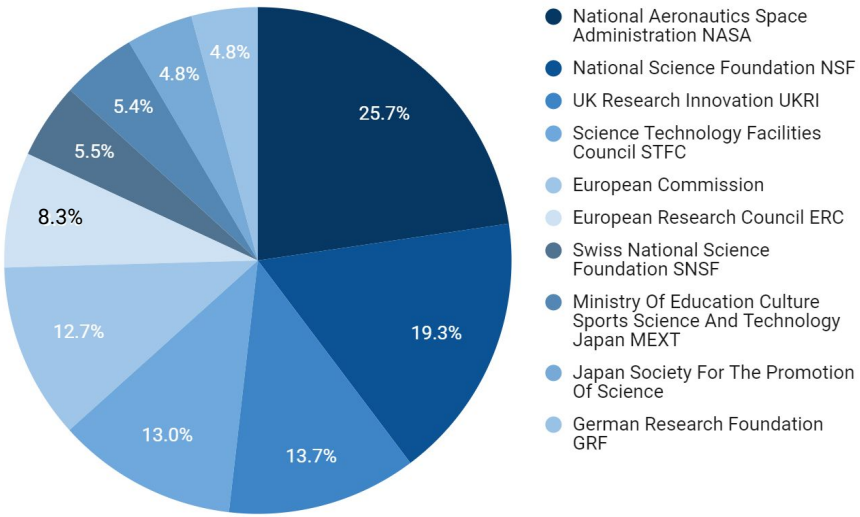
The special overview is the first step in separating truth from fiction in humanity's attempt to find intelligent life beyond our planet by **bringing together in one organization** the latest discoveries, trends, and developments in the field of extraterrestrial activity research. Extraterrestrial Institute created a **framework prototype** in order to provide the interested parties with an advanced definition of extraterrestrial activity research, which will provide the niche with a huge leap forward in terms of newfangled R&D.

No conclusive evidence of alien life has been found despite ongoing research. Thus, Extraterrestrial Institute created a **sophisticated analytical system prototype**, which will be improved in the process of iterative updating and increasing functionality, turning it into a big data analytical system that will be able to show humanity the real state of things in the field of SETI.

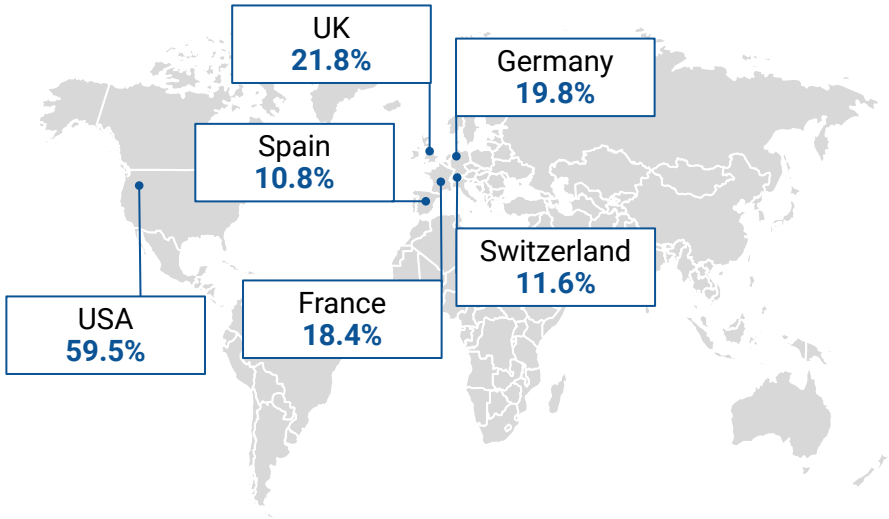
As a result, the brand-new reality implies a need to define and elaborate on relevant policies and technologies of **extraterrestrial interactions**. Extraterrestrial Institute discusses the current and future developments and makes a few projections concerning the future social impacts of discovering extraterrestrial forms of life.

Research Competition in Finding Extraterrestrial Intelligence

Top 10 Agencies that Fund Astrophysics Research



Top 5 Countries by the Number of Publications on the Topic of Extraterrestrial Life



By the number of publications related to the extraterrestrial life research, the USA takes the first place having slightly more than a half of all published scientific papers. It correlates well with the fact that top two agencies that fund astrophysics research are both US organisations: NASA and NSF. Other four leaders by the number of selected scientific publications are located in Europe where the UK accounts 21.8% of all publications. It is not a surprise since the British organisations take 3rd and 4th places in the list of funding agencies: UKRI and STFC (parent organisation: UKRI).

Source: Open Source Research by Extraterrestrial Institute

The Drake Equation

The Drake equation is a probabilistic reasoning is used to estimate the number of active, communicative alien civilisations that exist in the galaxy containing the Milky Way.

$$N = R^* \times f_p \times n_e \times f_l \times f_i \times f_c \times L$$

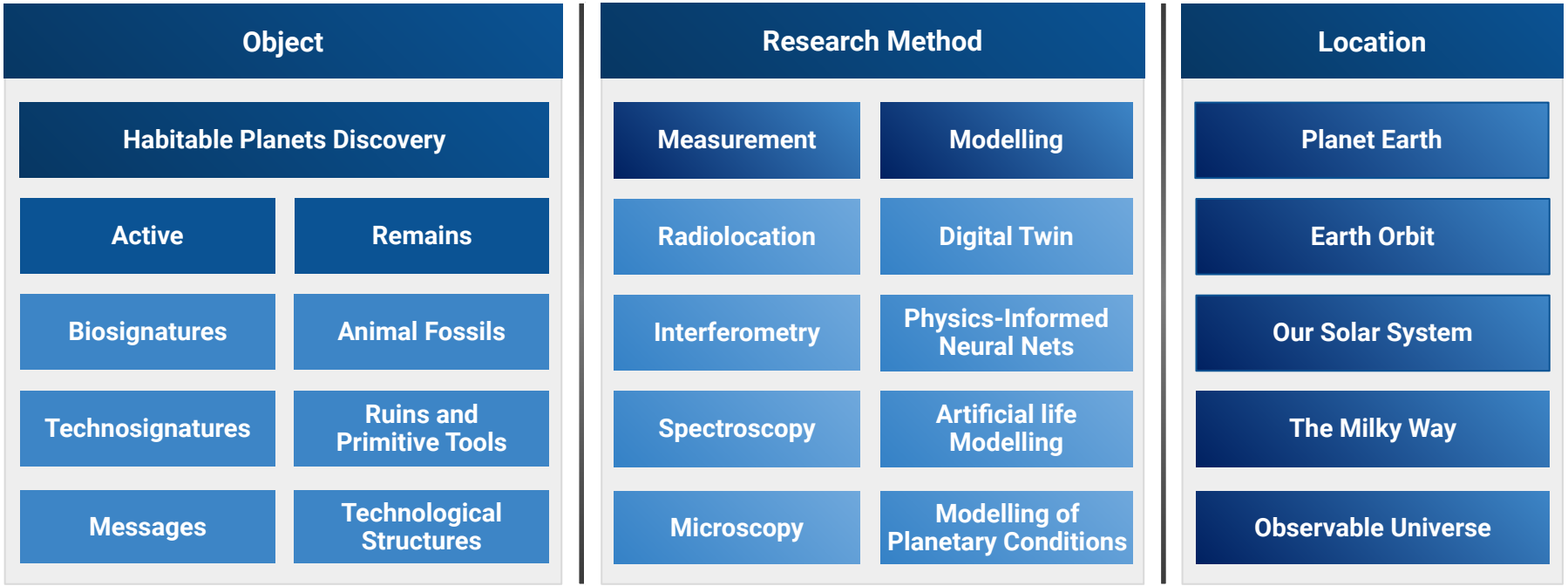
How It Does Work?

R^*	f_p	n_e	f_l	f_i	f_c	L	$= N$
the average rate of star formation **every year** in our galaxy	the fraction of those stars that **have planets**	the average number of planets that can **support life** in a star that has planets	the fraction of planets that **actually develop life**	the fraction of planets with life that actually go on to **develop intelligent life**	the fraction of intelligent life that replaces detectable **signs of existence in space**	the expected lifetime of such a civilisation for the period that it can communicate across the space	The number of civilisations in our galaxy with which communication might be possible

The numbers employed in several parts of the Drake equation are not well established; hence, the Drake equation can provide a very broad range of values, depending on the assumptions. Specifically, the outcome might be N<1, indicating that we are probably the only civilisation in the galaxy, or N>1, indicating that there are many other civilisations that we might meet. One of the few areas where there is a broad agreement is that the existence of humans presupposes a probability of the emergence of intelligence that is larger than zero.

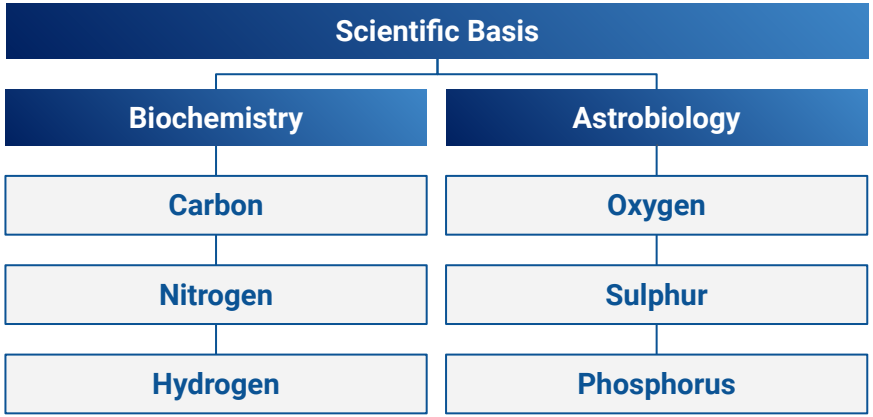
Study of Extraterrestrial Activity Framework Prototype

The framework is created to depict the most important sectors within the study of extraterrestrial activity. Scientists start building assumptions and find technosignatures, based on what they already know in terms of planetary science, moving on to the habitability and biosignatures of our Solar System. When it comes to objects located far from the Milky Way, the researchers tend to use extraterrestrial chemistry and astrobiology methods in order to prove the basis of the first given assumptions.

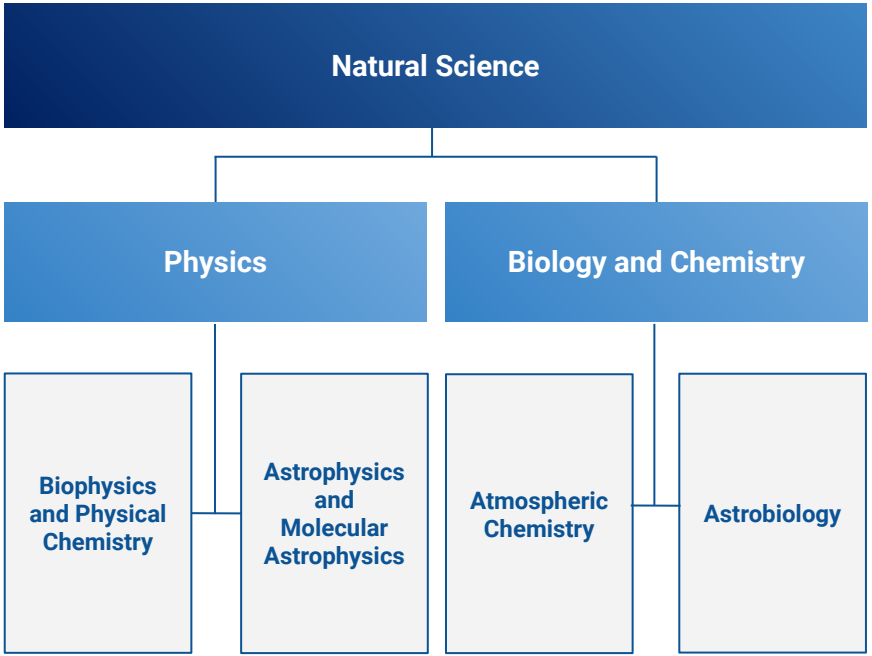


Key Life Elements Framework

One of the main questions the humanity has been asking for a long time about the existence of other forms of life outside Earth still did not receive the proper answer. Scientists from the best laboratories, using the most advanced technologies, have built an idea of how and where one could look for extraterrestrial life. This base has a purely scientific basis, such as what biochemical elements should be regarded as a potential equivalent of the prototype of life. And there are also suggestions about where there may be traces or indirect signs of finding extraterrestrial life forms.



The presence of the above chemicals are believed to be one of the prerequisites for life existence/emergence. At the same time, it is possible to suggest that there are other chemical compounds that can create life-like forms. Thus, being a common framework, this methodology is rather an example of how we *think* the life can be created rather than how we *know* it should be.



Astrobiology Is a Key to Define Extraterrestrial Life

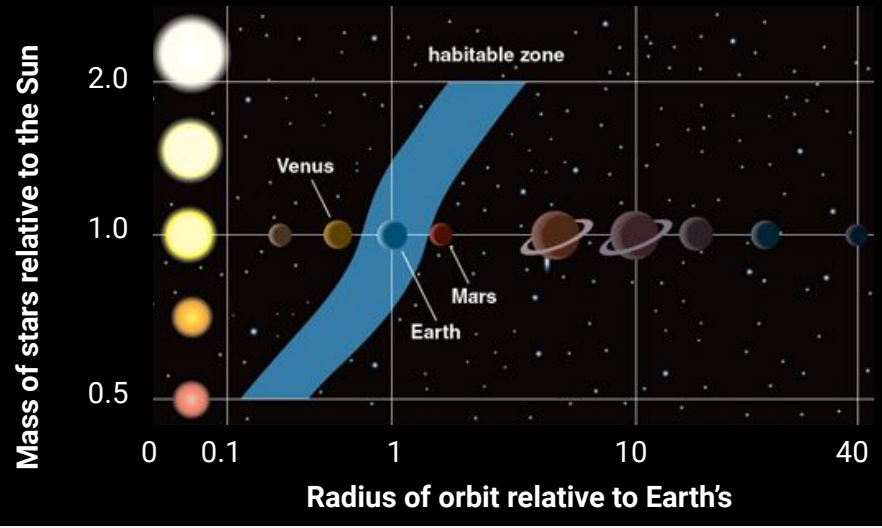
Astrobiology is quickly becoming a topic with active scientific and technical research. There has been a lot of interest in the numerous recent space missions to asteroids, comets, and other celestial bodies in search of alien primitive life. Several additional spacecraft thereafter followed the Viking landings on Mars. It was discovered by the Cassini Probe to Saturn and the Galileo Mission to Jupiter that several of these big planets' moons might have enormous amounts of water beneath their surfaces.

Main Trends in Astrobiology

- Exobiology
- Life on Other Planets
- Extrasolar planets
- Astronautics
- Origin of Life
- Outer Space Exploration

Rare Earth Hypothesis

According to this hypothesis, life on Earth is possible because of a conjunction of the right circumstances (galaxy and location within it, Solar System, star, orbit, or atmosphere, etc.)



The location of the habitable zone, the range of distances from a star where temperatures allow water to be liquid, varies depending on the mass and age of the star. If a habitable zone is too close to its star, any planet located there may become tidally locked, with one side perpetually facing the star.

Source: Stanford

Planetary Intelligence

Adam Frank, Professor of Physics and Astronomy at the University of Rochester, and his colleagues, David Grinspoon from the Planetary Science Institute and Sara Walker from Arizona State University, in a paper published in *the International Journal of Astrobiology* combined current scientific understanding about Earth with broader questions about how life alters a planet. The researchers discuss what they call 'planetary intelligence' – the idea of cognitive activity operating on a planetary scale.

Four Stages of Planetary Intelligence

Characteristic of very early Earth, billions of years ago and before a technological species when microbes were present, but vegetation had not yet come about

Earth before a technological species, from about 2.5 billion to 540 million years ago. Stable continents formed; vegetation and photosynthesis developed oxygen built up in the atmosphere.

Current stage

Interlinked systems of communication, transportation, technology, electricity, and computers. The technosphere is still immature.

Technological systems in place that benefit the entire planet, including globally harvesting energy in forms like solar that do not harm the biosphere

Source: International Journal of Astrobiology

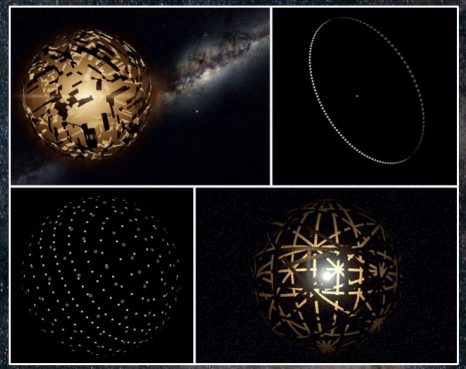
Picking Up Pollution and Alien Megastructures

Another technosignature could be the pollution that aliens in the early stages of technological development are pumping into the atmosphere of the planets they inhabit. Indeed, atmospheric chemical pollutants could be identified in the same way as biosignatures like oxygen and methane by looking at the spectral data. Spectral templates will come from running climate models that depend on the planet's features.

A notable technosignature would be the detection of a Dyson sphere – a hypothetical megastructure first proposed by Freeman Dyson in *Science* magazine in 1960. Originally conceived as a hollow shell that an advanced exocivilisation might construct surrounding its host star, the sphere would capture all of the star's energy – in our case, two billion times more energy than falls on Earth's upper atmosphere.

SETI has traditionally focused on looking for signs of life by scanning the skies for **electromagnetic radiation**.

Image: *A false-color view constructed using infrared data from the Spitzer Space Telescope of the Orion Nebula.*



Energy harvester
The classic Dyson sphere is a 'shell' (top left) that completely surrounds a star. This would be mechanically unstable, but other Dyson megastructures that are more likely to work include the ring (top right), bubble (bottom left), and swarm (bottom right).

Another suggested technosignature pollutant is nitrogen dioxide, NO_2, which is found here on Earth as a by-product of combustion from vehicles and fossil-fuelled power plants.

Solar collectors on these structures could beam microwaves down to the planet's surface for power, which could drastically modify the star's spectrum, creating an infrared blackbody.

Sources: MotherJones, NewScientist

Precise Kepler Research in the Borders of the Milky Way

A Brief Summary of the Kepler Mission

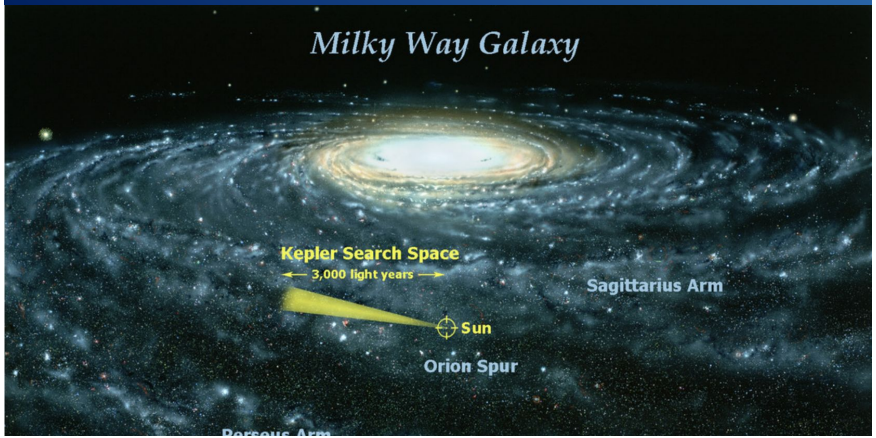
Kepler was NASA's first mission devoted to the search for exoplanets via the transit technique. The idea was to put a telescope in space, above Earth's atmosphere, in order to make very, very precise measurements of stellar brightness -- because only measurements at the level of 0.01 percent or better can show evidence for Earth-size planets orbiting Sun-size stars. Kepler's camera contained 42 CCD chips, covering an area of on the sky of about 16x16 degrees -- inside of which might be tens of thousands of stars.

1. Kepler's mirror was relatively small: about 1.4 meters in diameter.
2. The entire package was part of a satellite about the size of a truck.

Before Kepler was launched, the number of transiting exoplanets was relatively small; not a single planet as small as Earth had been found by this method

When the Kepler satellite was decommissioned in Oct, 2018, the final count of planets (or planetary candidates) discovered by the mission was somewhere above 5,000.

In order to maximize the number of planets found over the course of its mission, Kepler pointed at a region which contained lots of stars: a section of the sky close to the Milky Way.

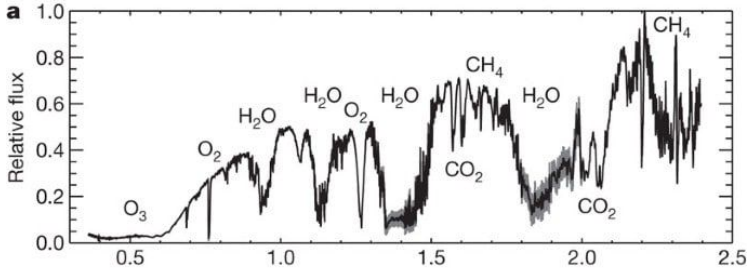


Spectroscopy

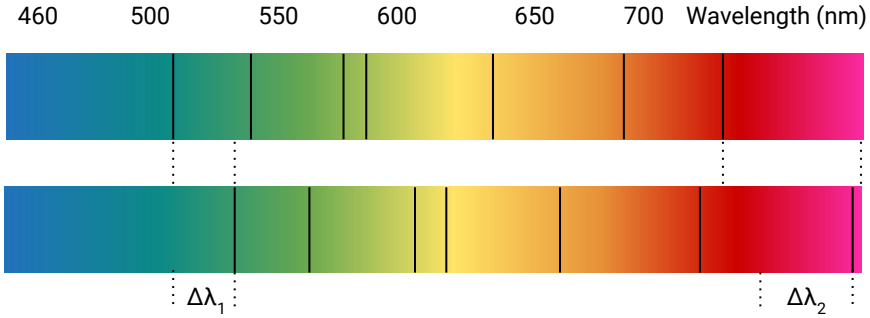
Spectroscopy is one of the main methods of exploring stars, galaxies, quasars and planets by measuring their response to different frequencies of radiation. Different celestial objects produce different types of spectra what is an output information of matter and materials of the object.

Continuum spectrum	Absorption spectrum	Emission spectrum

By comparing spectrums the chemical composition of objects can be determined. This provides the scientists with wide markers that can prove or disprove existence of parameters that are needed for life. Complex molecules like oxygen, carbon, and hydrogen are the basis of life on Earth.



Earth's transmission spectrum



The Doppler Effect is used to discover extrasolar planets through change of frequency on spectrum. The precision what we need to discover a Jupiter-like planet is 28.4 meters per second. In comparison we need a 9 centimeters per second to detect an Earth-like planet. For this purpose spectroscopists are using high-precision radial-velocity spectrographs.

ESPRESSO – third-generation echelle spectrograph

Sources:

Big Data ML-Modelling for Extraterrestrial Research

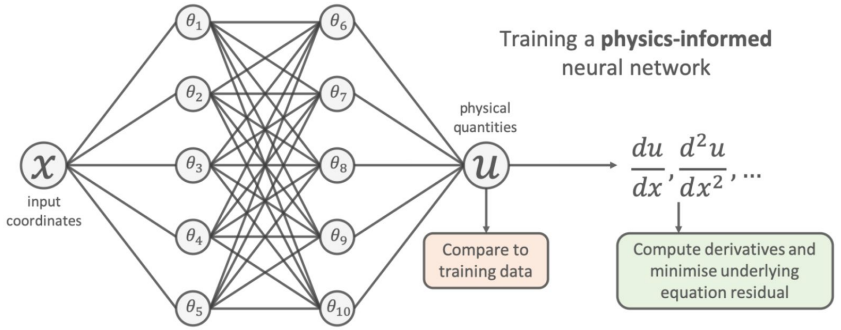
SETI Institute spin-off Frontier Development Lab (FDL) applies AI technology to advance the frontiers of study and develop new tools to resolve some of humanity's most significant concerns. These include the effects of climate change, the prediction of space weather, the improvement of disaster response, and the identification of meteorites that may hold the key to understanding the history of our universe. FDL is a public-private partnership between NASA, DOE, the SETI Institute, Trillium Technologies, the ESA, and leaders in commercial AI, space exploration, and Earth science, including Google Cloud, NVIDIA, Intel, IBM and Microsoft.

Planet Poles Exploration

FDL in partnership with Luxembourg Space Agency investigate whether Physics-Informed Neural Networks (PINNs) could replace conventional lunar mapping techniques to facilitate rover traverses and human operations at the lunar or any other planet poles.

The PINNs underlying concept is to add the known differential equations directly into the loss function when training the neural network.

Whilst we focused on a specific physics problem here, physics-informed neural networks can be easily applied also to many other types of differential equations and are a general-purpose tool for incorporating physics into Machine Learning (ML).



Schematic of Physics-Informed Neural Network

Sources: Ben Moseley

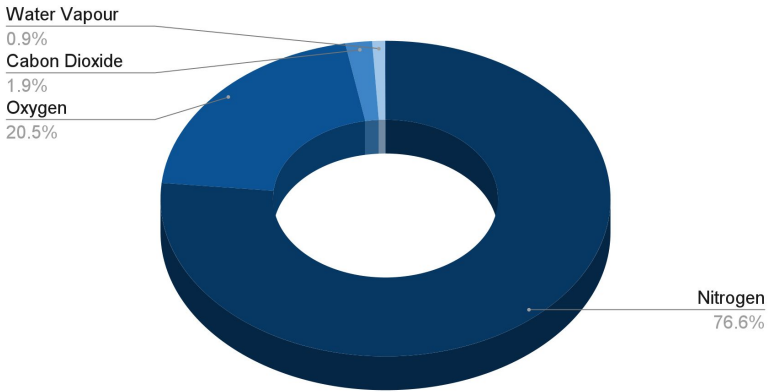
Detection of Extraterrestrial Life Across Locations

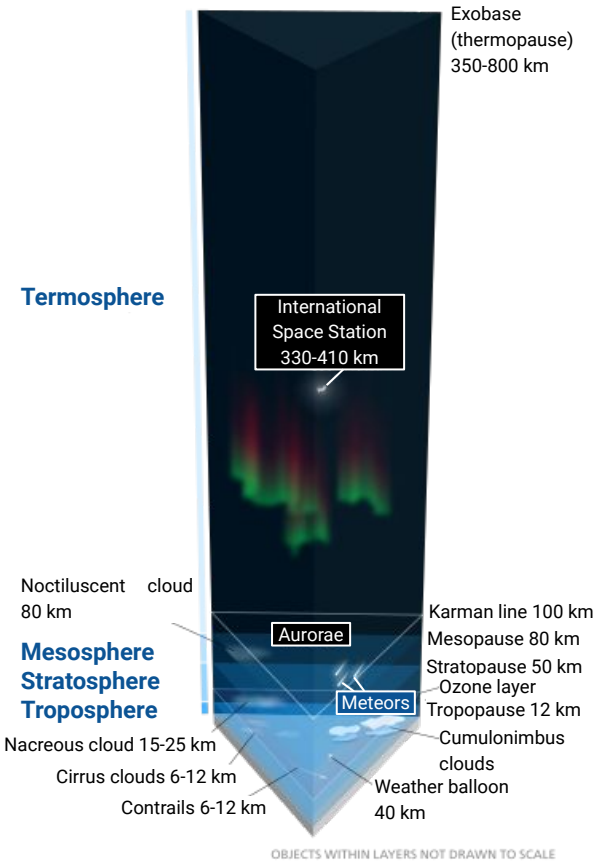
	Applied Methods	Features of Exploration	Promises of Further Exploration
Planet Earth	Electromagnetic radiation (EMR); Passive and active Passive EMR	Dealing mostly with UAP, investigating their nature which can be caused by numerous factors	Statistically greater number of cases would bring the more clear understanding for future events
Earth Orbit	Studying the chemical composition of Earth's Moon and other satellites; Data from robotic space probes	Key challenge lies in sampling the surface of objects, broader identification of biosignatures	Relatively low chances for detection of the signs of extraterrestrial activity
Solar System	Comparative planetology; Solar and chemical propulsion; Aerocapture techniques; Robotic or sample return missions	Dealing with the large diversity of geological processes; probably better comparability of characteristics compared to Earth and more effective tools in hand	Further research is an important means for human and scientific self-assertion
The Milky Way	Transit methods for exoplanets detection; Transit spectroscopy; Mapping of habitable zones	Dealing with larger distance, yet can be detectable from a long-term perspective	Depends on further exploration of exoplanets and finding the bio or technosignatures
Observable Universe	Doppler's measurements; Microlensing; Astrometry; Direct imaging	Broader exploration is likely to place more stringent technical requirements on the relevant instrumentation that demanded by current objectives	The greater probability of finding the effort to find advanced civilisations or their signs; means of communications are limited and time-consuming

The Earth Atmosphere Should Be Observed More Carefully

The layer of gases maintained by Earth's gravity that surrounds the planet and creates its planetary atmosphere is known as the atmosphere, or what we call 'air'. Because of pressure created by the atmosphere, liquid water may exist on Earth's surface, ultraviolet solar radiation is absorbed, warming the surface through heat retention (greenhouse effect), and temperature extremes between day and night are reduced (the diurnal temperature variation).

Composition of Earth's Atmosphere



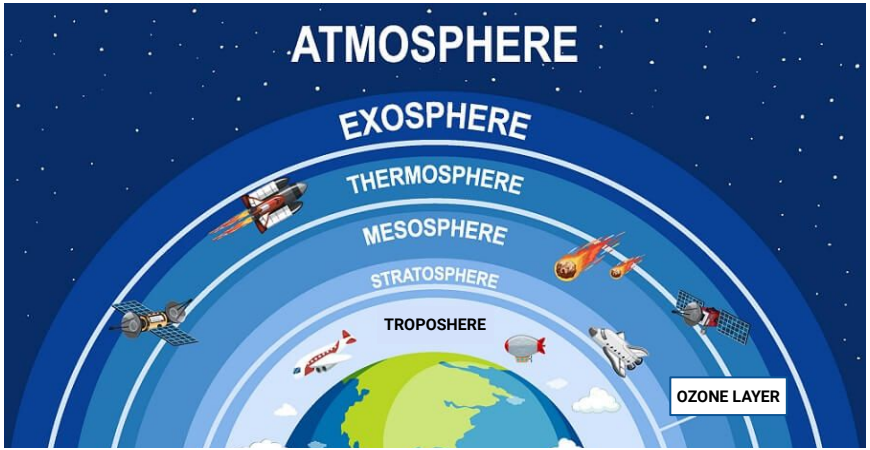


Earth's Atmosphere Lower four layers of the atmosphere in three dimensions as seen diagonally from above the exobase. Layers drawn to scale; objects within the layers are not to scale. Aurorae shown here at the bottom of the thermosphere can actually form at any altitude in this atmospheric layer. The Earth atmosphere is a place that is not observed carefully in every corner possible. There is plenty of room to detect signs of extraterrestrial presence.

Source: Earth Reminder

Low Earth Orbit Has Plenty of Room for Near Research

An orbit having a period of 128 min or less (making at least 11.25 orbits per day) and an eccentricity of less than 0.25 is referred to as a low Earth orbit (LEO). The majority of man-made satellites are in LEO, never rising above an altitude of about one-third of the radius of Earth. The region of space below 2,000 km, or roughly one-third of Earth's radius, is also referred to as the LEO region. Even if they are suborbital or have an apogee further out, objects on orbits that pass through this zone are closely monitored because they pose a risk of colliding with the numerous LEO satellites.



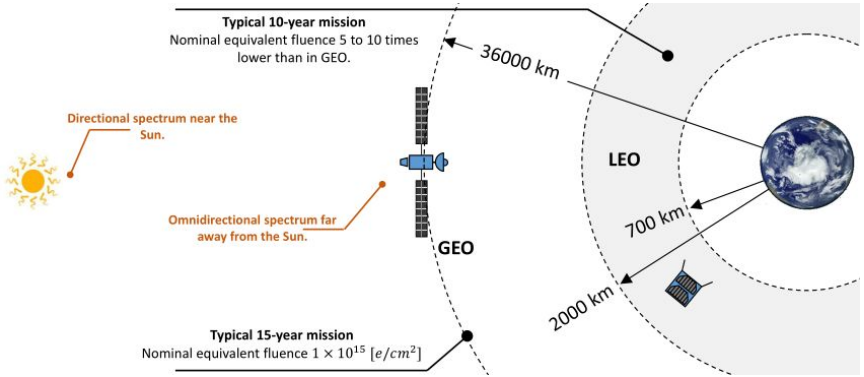


Illustration of the low earth orbit (LEO) and geostationary earth orbit (GEO) with typical equivalent fluences

Examples

- The International Space Station is in a LEO about 400 km (250 mi) to 420 km (260 mi) above Earth's surface and needs reboosting a few times a year due to orbital decay.
- The Iridium telecom satellites orbit at about 780 km (480 mi).
- The Hubble Space Telescope orbits at about 540 km (340 mi) above Earth.
- The Chinese Tiangong space station was launched in April 2021 and currently orbits between about 340 km (210 mi) and 450 km (280 mi).

Source: Space.com

Habitability of Planets in the Solar System

Mercury

The spacecraft MESSENGER found evidence of water ice on Mercury.

Saturn

Like Jupiter, Saturn is not likely to host life. However, Titan and Enceladus have been speculated to have possible habitats supportive of life.

Mars

Current studies on Mars by the Curiosity and Opportunity rovers are searching for evidence of ancient life, including a biosphere based on autotrophic, chemotrophic, chemolithoautotrophic microorganisms, as well as ancient water.

The Moon

3.5 to 4 billion years ago, the Moon could have had a magnetic field, an atmosphere, and liquid water sufficient to sustain life on its surface.

Jupiter system

Scientists have indications that heated subsurface oceans of liquid water may exist deep under the crusts of the three outer Galilean moons: Europa, Ganymede, and Callisto. The EJSM/Laplace mission was planned to determine the habitability of these environments; however, due to lack of funding, the programme was not continued. Similar missions like ESA's JUICE and NASA's Europa Clipper are currently in development and are slated for launch in 2023 and 2024, respectively.

Other bodies

Models of heat retention and heating via radioactive decay in smaller icy Solar System bodies suggest that Rhea, Titania, Oberon, Triton, Pluto, Eris, Sedna, and Orcus may have oceans underneath solid icy crusts approximately 100 km thick.

Small Solar System bodies

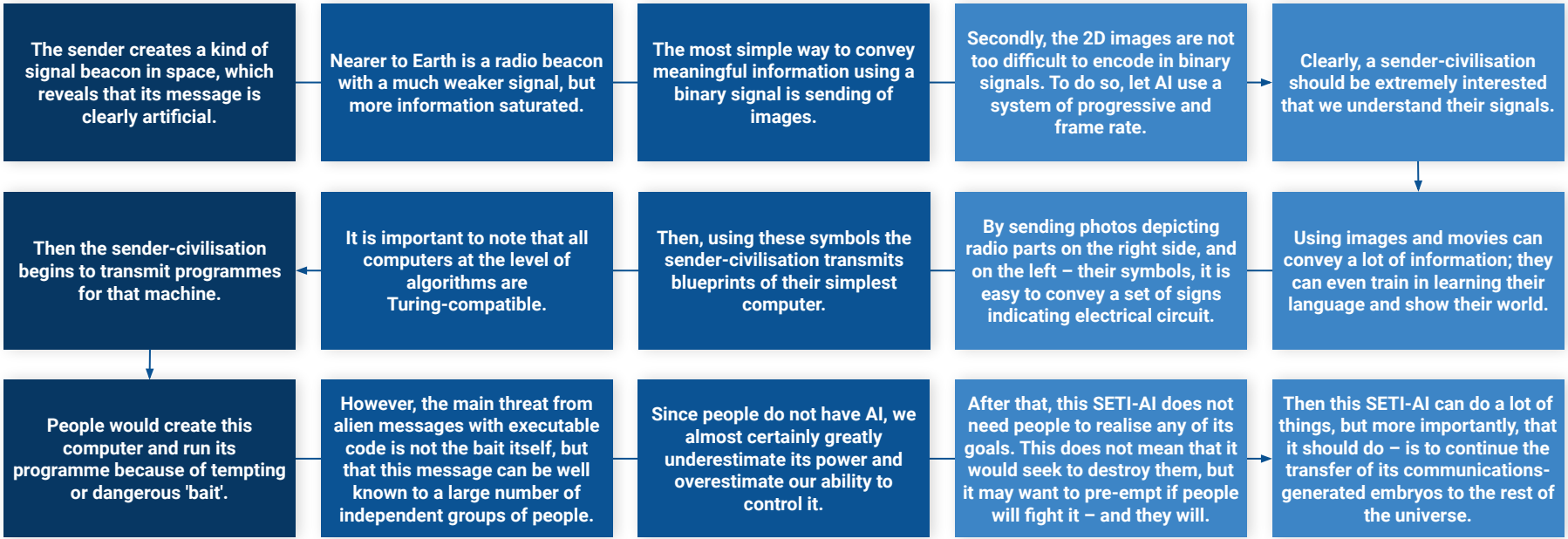
Small Solar System bodies have also been speculated to host habitats for extremophiles. Fred Hoyle and Chandra Wickramasinghe have proposed that microbial life might exist on comets and asteroids.

Source: Open Source Research by Extraterrestrial Institute

Risks of Downloading Alien AI via SETI

Despite the growing interest in finding extraterrestrial life, there exist risks associated with the programme of the passive search for alien signals. The idea that passive SETI can be **dangerous** is not new. Fred Hoyle was the first to suggest a scheme of alien attack through SETI signal in the story '**A for Andromeda**'.

Potential Algorithm of Alien Virus Attack through SETI



Source: Lesswrong

Risks Associated With Contacting the Extraterrestrial Civilisations

Making attempts to reach other civilisations itself may be dangerous

Extraterrestrial civilisations are remaining out of contact because they may know that sending out signals is catastrophically risky. Exposing yourself can be regarded as an invitation to be preyed upon and devoured.

The mankind lacks the joint action plan

Contacting extraterrestrials without prior broad agreement from some globally representative body should be considered as the endangerment of all mankind and absolutely proscribed with criminal consequences.

Risks

Contacts may look like Columbus meeting Native Americans

Certain extraterrestrial civilisations may have used up resources from their home planets. Such advanced aliens would perhaps become nomads, looking to conquer and colonise whatever planets they can reach.

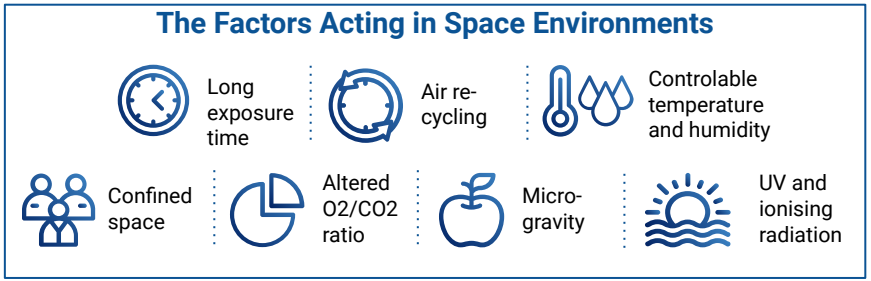
Extraterrestrials may be better aware of possible risks

If none of the billion and billions of planets in space have developed civilisations that are advanced enough to communicate with or be detected by humans, then there must be something that prevents that from happening.

Biological Viruses in Space

On 11 October 1968, an astronaut caught a cold and infected the whole crew on Apollo 7. Without gravity, mucous collected, creating pain. The astronaut did not even wear helmets while landing because they feared Earth's atmosphere could damage their sinuses or eardrums. Since NASA opted to confine all astronauts for two weeks before flight, there have been no viral breakouts in space.

The Factors Acting in Space Environments

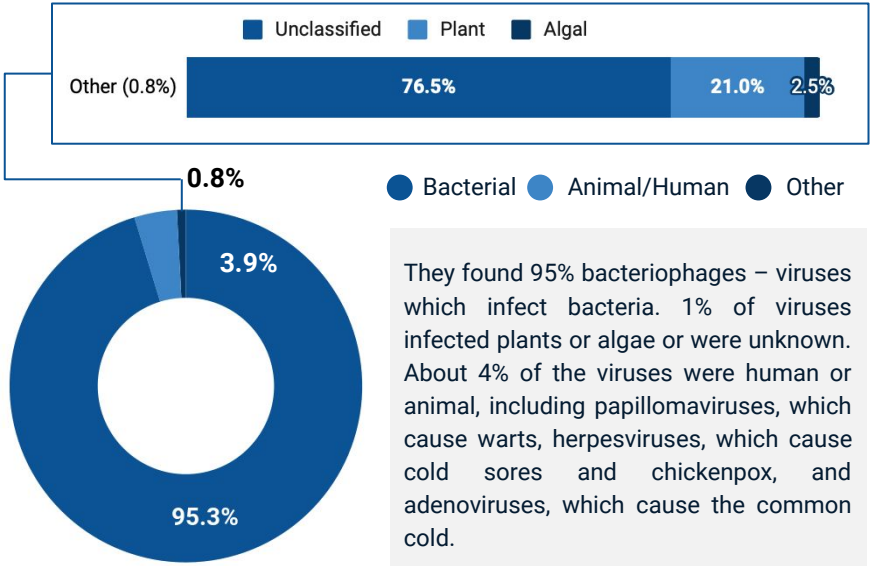


Reactivated Viruses

Some dormant viruses in astronauts' bodies may reactivate in space, causing symptoms or replication. Herpesviruses like varicella zoster cause chickenpox and shingles in adults when reactivated. Ultraviolet radiation exposure has been shown to reactivate viruses in rodents and suppresses the immune system of humans and animals. Differences in humidity, gravity, dehydration, and sleep deprivation could also influence virus reactivation in space (see picture above).

Microbiome of the ISS Surfaces

Only one analysis of viruses in space has been done so far. It examined viruses aboard the International Space Station (ISS) and was published in the journal *Nature Communications* in 2019. In that study, researchers sequenced viral genomes and identified various viruses using swabs taken from surfaces on the space station.



They found 95% bacteriophages – viruses which infect bacteria. 1% of viruses infected plants or algae or were unknown. About 4% of the viruses were human or animal, including papillomaviruses, which cause warts, herpesviruses, which cause cold sores and chickenpox, and adenoviruses, which cause the common cold.

Source: Astrobiology Journal

Scientific Communities Focused on Extraterrestrial Life

The Galileo Project

www.projects.iq.harvard.edu/galileo

The goal of the *Galileo Project* is to bring the search for extraterrestrial technological signatures of Extraterrestrial Technological Civilisations (ETCs) from accidental or anecdotal observations and legends to the mainstream of transparent, validated, and systematic scientific research.

Berkeley SETI

www.seti.berkeley.edu

Berkeley SETI Research Center searches for electromagnetic signatures of intelligent extraterrestrial civilisations, spanning wavelengths from radio to visible light. They take part in the new Breakthrough Listen initiative to use the Green Bank, Parkes, and Automated Planet Finder telescopes.

Astrobiology Society of the University of Manchester

www.astrobiologysociety.com

Created in 2020, the organisation delivers world-class education and science exchange, creates high-quality events to enrich and promulgate astrobiology, and along the way. It is a nonprofit organisation registered within the University of Manchester.

Extraterrestrial Materials Analysis Group

www.lpi.usra.edu/exmag

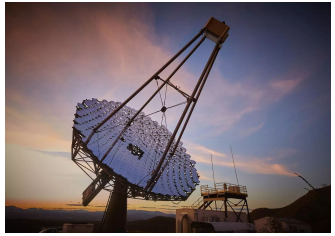
Community-based, interdisciplinary group providing a forum for discussion and analysis of matters concerning the collection, curation, and analysis of extraterrestrial samples, including planning future sample return missions.

Ongoing Radio Searches of Extraterrestrial Activity

Because many radio frequencies penetrate Earth's atmosphere efficiently, radio telescopes with huge radio antennas have been developed to study the cosmos. Furthermore, as a result of communications such as television and radio, human pursuits create significant amounts of electromagnetic radiation.

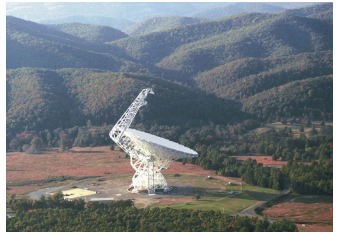
The SETI Institute collaborated with the Radio Astronomy Laboratory at the Berkeley SETI Research Center to develop a specialised radio telescope array for SETI studies, something like a minicyclops array. Formerly known as the One Hectare Telescope (1HT), the concept was renamed the '**Allen Telescope Array**' (ATA) after the project's benefactor Paul Allen. Its sensitivity would be equivalent to a single large dish, more than 100 m.

SERENDIP (Search for Extraterrestrial Radio Emissions from Nearby Developed Intelligent Populations) is a SETI programme launched in 1979 by the Berkeley SETI Research Center. SERENDIP takes advantage of ongoing 'mainstream' radio telescope observations as a 'piggy-back' or 'commensal' program, using large radio telescopes, including the NRAO 90-m telescope at Green Bank and the Arecibo 305-m telescope.



Breakthrough Listen is a 10-year initiative with $100 million funding, begun in July 2015 to actively search for intelligent extraterrestrial communications in the universe, in a substantially expanded way, using resources that had not previously been extensively used for the purpose. It has been described as the most comprehensive search for alien communications to date.

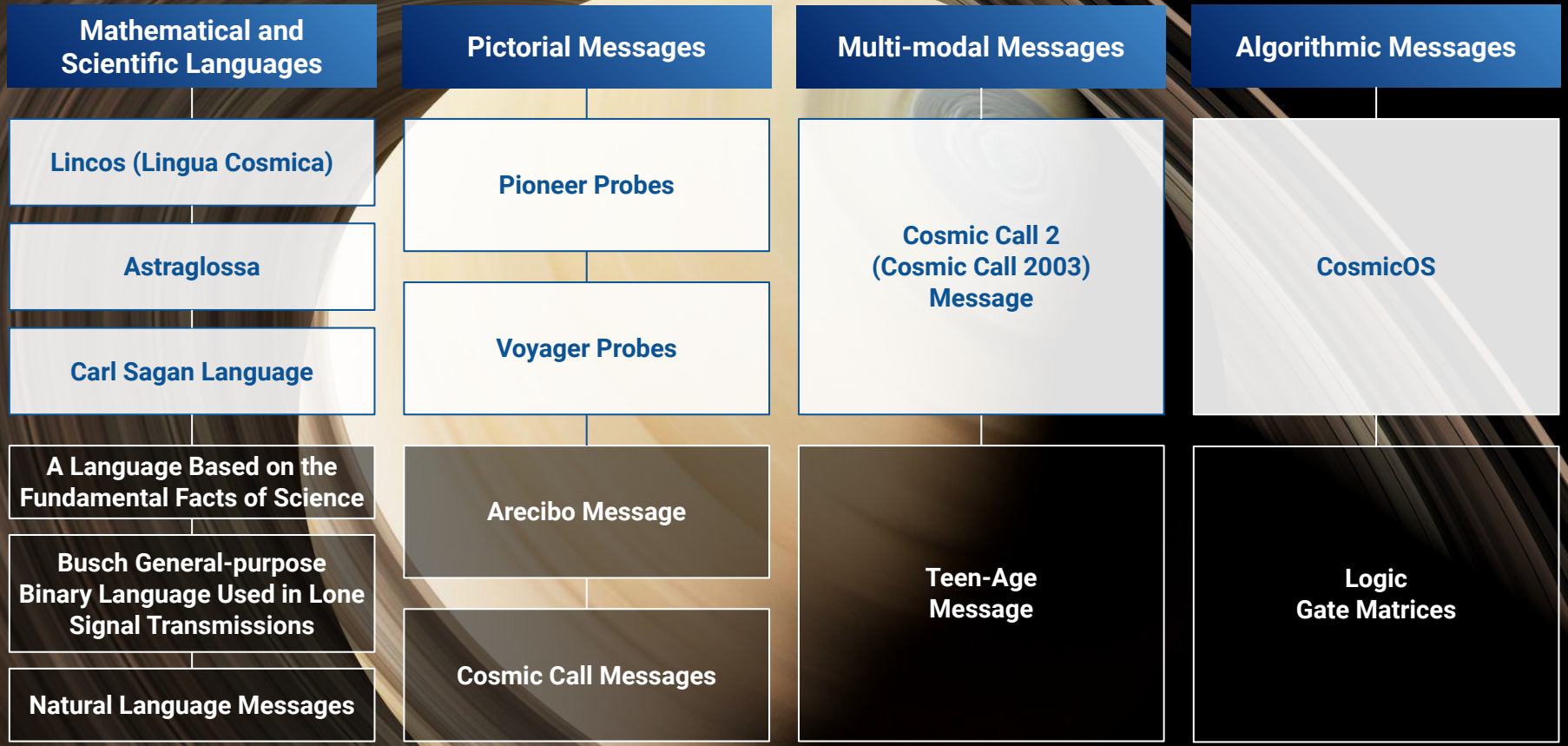
China's 500-m Aperture Spherical Telescope (**FAST**) lists detecting interstellar communication signals as part of its science mission. It is funded by the National Development and Reform Commission (NDRC) and managed by the National Astronomical observatories (NAOC) of the Chinese Academy of Sciences (CAS). FAST is the first radio observatory built with SETI as a main scientific goal.



Since 2016, **UCLA** undergraduate and graduate students have been participating in radio searches for technosignatures with the Green Bank Telescope. Targets include the Kepler field, TRAPPIST-1, and solar-type stars. The search is sensitive to Arecibo-class transmitters located within 420 LY of Earth and to transmitters that are 1,000 times more powerful than Arecibo located within 13,000 LY of Earth.

Sources: Open Source Research by Extraterrestrial Institute

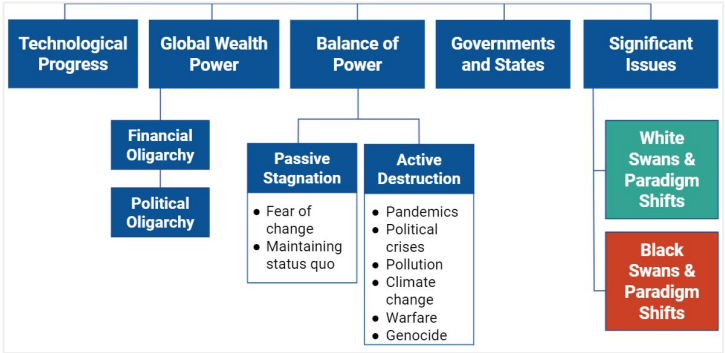
Extraterrestrial Communication Framework Prototype



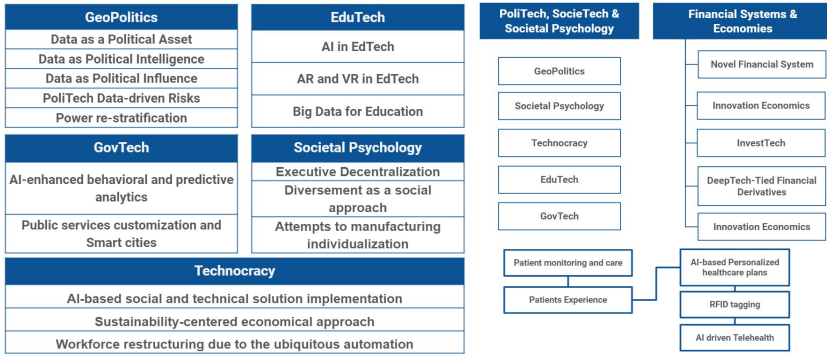
Extraterrestrial Activity Is an Integral Part of the 5th Industrial Revolution

The search for extraterrestrial intelligence may become a focal point within the technological progress of humanity. Any evidence of biomarkers indicating the presence or **carbon-based lifeform** would potentially redefine the scientific and technological approaches to humanity **industrial development**. But what is critically required at this point in the technological evolution of global society is a middle ground where these predictive extremes are balanced by realistic, quantitative, and tangible analytical frameworks to define, describe, and forecast the true present and future state of technological progress. This is precisely the mission of **Deep Knowledge Group**.

5th Industrial Revolution 'Socium' and Ethics Framework



Political, Health, and Financial Technologies to Optimise the Impact of DeepTech on Global Humanity



The 5th Industrial Revolution Interactive Virtual Reality Big Data Analytics Dashboard and Multidimensional 3D Framework

Source: The Fifth Industrial Revolution

Organisations and Programmes on Finding Extraterrestrial Life

At the moment, dozens of organisations, projects, and initiatives working around the world are aimed at identifying signals associated with signs of extraterrestrial life. At this stage of development, there has not been a single successful documented or confirmed attempt at such contact. However, the following organisations are making every effort.

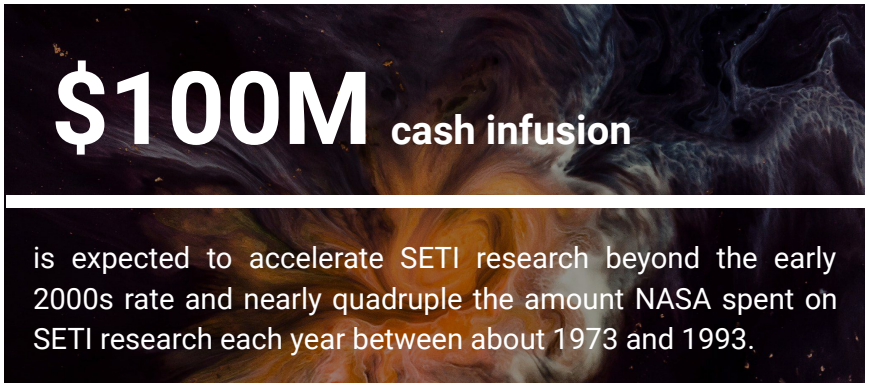
Project 'BETA' - Billion-channel Extraterrestrial Assay	Project Argus	SERENDIP Program	UAPx
SETI Institute	Microwave Observing Program (MOP)	Breakthrough Initiatives	SETI Net
Project Ozma	Project Phoenix	China's 500 meter Aperture Spherical Telescope (FAST)	UFODAP
Project 'META' – Megachannel Extra-Terrestrial Assay	Allen Telescope Array	UCLA Search	Advanced Aerospace Threat Identification Program

Breakthrough Initiatives

BREAKTHROUGH INITIATIVES

With a minimum 10-year search period, the science-based initiative Breakthrough Initiatives was established in 2015 and supported by **Julia and Yuri Milner**.

Physicist **Stephen Hawking** revealed the Breakthrough Initiatives to the world on 20 July 2015, at London's Royal Society. The Initiatives were established by Russian businessman Yuri Milner to look for intelligent alien life and to consider a strategy for potentially sending signals into space. Several scientists, including Hawking, co-signed an open letter that was included in the announcement that called for a stepped-up search for extraterrestrial radio signals.



Projects	
Breakthrough Listen	A programme that will comprise an effort to search over 1,000,000 stars for artificial radio or laser signals.
Breakthrough Message	An effort to create a digital message 'representative of humanity and planet Earth'.
Breakthrough Starshot	Co-founded with Mark Zuckerberg, aims to send a swarm of probes to the nearest star at about 20% the speed of light.
Breakthrough Watch	Aims to identify and characterise Earth-sized, rocky planets around Alpha Centauri and other stars within 20 light-years of Earth.
Breakthrough Enceladus	A mission to Saturn's moon Enceladus, in search for life in its warm ocean, and in 2018 signed a partnership agreement with NASA for the project.

Source: Breakthrough Initiatives

UAP Global Sightings

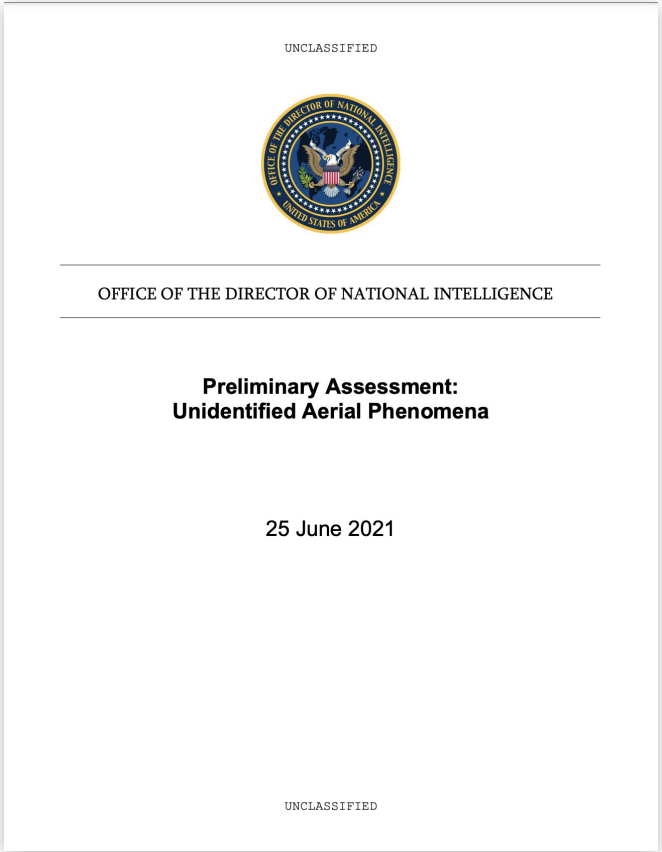
Unidentified Aerial Phenomena (UAP) are often associated with the probability of signs of extraterrestrial life.

World Map of Single or Group Sightings

This map represents the density of UAP single or group sightings throughout the world. According to the statistics, the most frequent sightings are occurred in the USA and Western and Central Europe, which are considered to be the most developed parts of the world.

Source: Medium

Preliminary Assessment: Unidentified Aerial Phenomena



UNCLASSIFIED

OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE

Preliminary Assessment:
Unidentified Aerial Phenomena

25 June 2021

UNCLASSIFIED

'Preliminary Assessment: Unidentified Aerial Phenomena', also known as the UAP Report and colloquially misnamed the Pentagon UFO Report, is a United States federally mandated assessment, prepared and published by the Office of the Director of National Intelligence on 25 June 2021, which summarises information regarding UAP that include unidentified flying objects. Substantial public attention had been given to the mandated June report, fueled by statements by former high level officials in the US government, including former president **Barack Obama** who stated in June 2021 **'...there's footage and records of objects in the skies, that we don't know exactly what they are'.**

UAP Expanded Classification Categories

- **Airborne Clutter**
- **Natural Atmospheric or Other Phenomena**
- **Human-related Phenomena**
- **Industry Developmental Programs**
- **Unclassified Governmental Technology**
- **Unclassified Private Technology**
- **Other**

Source: The Office of the Director of National Intelligence

Government Responses on Extraterrestrial Activity

One of the NASA divisions is the Office of Safety and Mission Assurance (OSMA), also known as the Planetary Protection Office. A part of its mission is to 'rigorously preclude backward contamination of Earth by extraterrestrial life'.

In 2020, the Japanese Defense Minister Taro Kono stated that Self-Defense Forces pilots have never encountered a UFO and that he does not believe in UFOs. He also said he would consider issuing protocols for such encounters.

In 2016, the Chinese Government released a white paper detailing its space programme. According to the document, one of the research objectives of the programme is the search for extraterrestrial life. It is also one of the objectives of the Chinese Five-hundred-meter Aperture Spherical Telescope (FAST) programme.

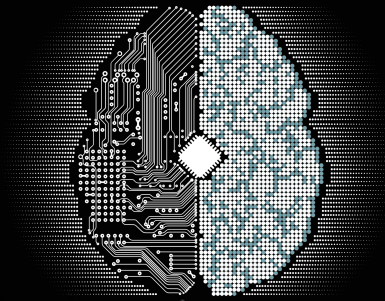
In 2018, the German Ministry of Economics stated that the German government has no plans or protocol for the case of a first contact with aliens, as the government perceives such event as 'extremely unlikely'. It also stated that no cases of a first contact are known.

In 2020, chairman of the Israel Space Agency Isaac Ben-Israel stated that the probability of detecting life in outer space is 'quite large'. But he disagrees with his former colleague Haim Eshed who stated that there are contacts between an advanced alien civilisation and some of the Earth's governments.

Source: Open Source Research by Extraterrestrial Institute

Key Takeaways

- The chemicals necessary for Earth's biochemistry have already been discovered in the interstellar medium, planetary atmospheres, as well as on the surfaces of comets, asteroids, meteorites, and interplanetary dust particles. In fact, the building blocks of life are not in short supply.
- Astrobiology can barely be separated from its cultural context, including philosophical, ethical, and theological aspects, because the discovery and continued study of extraterrestrial life will radically challenge our understanding of nature, including ourselves.
- Water is required for life on Earth as a solvent for biological activities. On terrestrial planets with a chemical make-up and temperature range similar to Earth, sufficient amounts of carbon and other elements may enable the creation of living beings.
- According to an analysis of organic chemistry, life, as a chemical system capable of Darwinian evolution, may exist in a variety of situations. These may be low-temperature nonaqueous solvent systems or even supercritical dihydrogen-helium mixtures.
- A key result here is that when one compares the rare-life versus common-life scenarios, the common-life scenario is always at least nine times more likely than the rare one. Kipping’s study puts the squelch on the idea that intelligence may emerge in the cosmos at a very rapid rate.
- If humanity did not waste its potential on wars and division of the Earth, but was engaged in the development of technologies, then perhaps research in this field would be much more serious, so we suggest thinking and laying the foundations of the 5th industrial revolution these days in order to push the humanity forward to the unknown worlds.
- Astrobiology is quickly becoming a topic with active scientific and technical research. There has been a lot of interest in the numerous recent space missions to asteroids, comets, and other celestial bodies in search of alien primitive life.



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